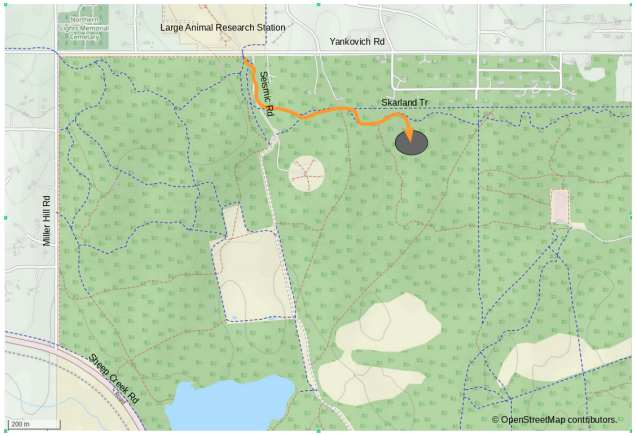
Figure 1: The Yankovich Burn ignited near homes in the "Wildland-Urban Interface" (Image: Alaska Division of Forestry).



Wildland Fire in a Boreal Forest

Learn about wildland fire in a "Living Classroom". Follow changes in vegetation and fuels at a 2021 burn on the UAF campus. More information is available at our website at the Alaska Fire Science Consortium:

`www.frames.gov/afsc/yankovich-road-fire`

Access

Access to the burn is from Yankovich Road across from the Large Animal Research Station, **2220 Yankovich Road, Fairbanks, Alaska** (Scan the QR codes for directions). Enter the UAF trail system on the south side of the road. The trail quickly crosses Seismic Road. Continue downhill on the Skarland Trail until it becomes wet where the creek crosses. The burn is visible from the trail to the right (south). Total walking distance from the trailhead is about 0.64 km or 0.4 mile, about a 10-15 minute walk.

Learning from a Wildland-Urban Interface Fire in Fairbanks

An Opportunity

A wildfire ignited in July 2021 in the North Campus of the University of Alaska Fairbanks near residences on Yankovich Road and was quickly suppressed. The area where houses intermix with burnable forests is called the "Wildland-Urban Interface." In the weeks after the burn several fire professionals and researchers collaborated to install permanently marked monitoring transects to track post-fire changes in vegetation and fuel accumulation. Annual remeasurements will track the changes in this **"living classroom"**, providing an opportunity for students, visitors, scholars, and the curious to follow the effects of wildland fire and fire suppression actions on a boreal black spruce forest.

Fuel Accumulation

Tree-rings tell us that the last fire to burn the forest occurred about 1875. Numerous, small, burned snags resulting from this fire can still be seen in the surrounding forest. Most soil pits also feature buried charcoal that is still visible after c. 150 years. In lowland black spruce forests the climate is too cold for biological decomposition to keep up with the production of plant detritus. As a result, litter and duff on the forest floor build at a rate of about **17 years per inch** and organic soils are a foot or more deep. More than a century of fuel accumulation is ready to burn and awaits an ignition.

The Fire

The Yankovich Fire ignited mid-July 2021 and is thought to have been human-caused. There was no lightning around the time of ignition. Fire Danger Rating Indices were fairly typical for the time of Year. Importantly, it was not windy.

Without wind, fires in black spruce forests creep through the surface fuels. Spread is much faster when wind throws embers ahead of crowning trees. The initial report indicated a vigorous surface fire with torching of individual tree crowns. There was not much fire activity elsewhere and fire crews and aviation resources were quickly available. The fire was initially contained by water-delivering **aircraft**: helicopters slinging water buckets and scoopers (water-dropping airplanes). Three 20-person ground crews and eight smokejumpers worked on the ground. The crews removed most of the snags and downfall in the burn for mobility and safety. Falling snags and branches are a particular hazard. The duff was thoroughly turned in places by hand tools and cold-trailed for hot spots throughout the burn.

Look For:

Forest Transition

As you first walk down the trail to the burn the forest is a mixture of white spruce, birch, and aspen. Soils here do not feature **permafrost** and the vegetation comprises mostly shrubs and herbs. The burn occurred lower down the slope in a **black spruce** forest where the soil transitions to permafrost and nonvascular mosses and lichens are more abundant.

Forest Succession

Surrounding the burn you can see small, blackened snags from a fire c. 1875. Following the fire the forest **succeeded** from shrubs to trees. Willows dominated the early post-burn environment, perhaps resprouting from roots. Spruce trees colonized from seed. and eventually over-topped and out-competed the willows.

Winter Canopy Breakage

One winter several years before the fire many spruce crowns around Fairbanks snapped under the load of snow. These dead, broken tree tops remained suspended close to the ground, deepening the fuelbed which may have impacted fire behavior at the Yankovich Burn. Homeowners would be well-advised to remove this type of **hazardous fuel** from their property.

Crown Fire

Blackened tree crowns tell you where a crown fire completely consumed the canopy. Orange or brown needles resulted from scorching heat– hot enough to kill the needles but not hot enough to ignite them.

Regrowth

Within a week of the burn green shoots **resprouted** inside the burn from underground growing points: sedges, willows, blueberry, rose. Other species must colonize by seed or spore. Black spruce carry semi-serotinous cones in a **canopy seed bank**. These cones open following fire and rain seed onto the burned forest floor. There is also a **soil seed bank**. Seeds may remain viable in the soil for years or decades, waiting for fire to open growing space.

Colonization

Marchantia polymorpha (a liverwort) and firemoss are two early colonizers, arriving within days or weeks. These species inhibit erosion by stabilizing the ash and soil.

Debris Piles

Firefighters worked the ground looking for smoldering hot spots. They felled many trees and snags to prevent injury– trees fall over when their roots burn out. Unburned debris was thrown across the fireline into "the green". Burned material was piled in "the black".

The Wildland-Urban Interface

This fire is another example of a near-miss in the Wildland Urban Interface. The outcome may have been very different if there was fire activity elsewhere and firefighting resources were stretched thin or if the winds were stronger. The fire burned to **within a 330 feet of homes**. There have been seven ignitions in the UAF North Campus since 1970, all of them human-caused and all of them suppressed. Suppression of fires in the WUI protects homes but does nothing to address **hazardous fuel build-up**. As long as vegetation grows fuel will accumulate.

Cultural Change

Recent "disaster" fires in the country are awakening a cultural change in attitude toward fire. At the Yankovich Burn, fuel has accumulated for 150 years yet it is only when an ignition occurs that we consider it an emergency. Most urban areas in Alaska fall within the "Critical" fire management response option with highest priority for suppression. Ironically, this is the area where fire is most needed to reduce the fuel load. In the absence of fire, defensive **FIREWISE** steps are important for nearly all rural properties in Alaska. Even better are offensive steps: hazard fuel reduction through thinning, pruning, and removal of surface fuels. Since fire burns across boundaries effectiveness increases with neighbor involvement.

Fire Effects

Burn Severity Burn severity ratings indicated a light to moderate severity fire.

Duff consumption About 9 cm (3.5") of duff (organic soil) was burned by the fire. This is about 13% by mass.

Roundwood consumption Fine fuels were reduced more than heavier fuels. Thousand-hour fuel loading (logs >3") actually increased due to the firefighters leaving wood fragments and piles of debris. All rotten wood was consumed.

Canopy cover Tree cover was entirely black spruce which declined from 37% to 8%.

Vegetative Cover Outside the burn feathermosses and lichens cover most of the ground, about 85%. The balance of cover is Ericaceous shrubs, prickly rose, and herbs. The burned transects featured only a few percent cover of surviving mosses.

The Yankovich Road Burn fire effects monitoring and education project is a collaboration between several organizations: Eric Miller (Bureau of Land Management Alaska Fire Service), Alison York & Zav Grabinski (Alaska Fire Science Consortium), Uma Bhatt, Anushree Badola, Christine Waigl, & Christopher Smith (University of Alaska Fairbanks), with help from Julia York, and Amelia Sikes.